United States
Environmental Protection
Agency

Air and Energy Engineering
Research Laboratory
Research Triangle Park, NC 27711

Research and Development

EPA/600/SR-95/065 June 1995

EPA

Project Summary

Ventilation Technology Systems Analysis

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The full report gives results of a project to develop a systems analysis of ventilation technology and provide a state-of-the-art assessment of ventilation and indoor air quality (IAQ) research needs. Goals of the analysis were to (1) define the state-of-the-art in building design and operation, (2) identify emerging technologies and trends that will influence IAQ, building design, and operation, and (3) define and prioritize ventilation research needs that will improve IAQ.

This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Objective

The objective of this project was to develop a systems analysis of ventilation technology and provide a state-of-the-art assessment of ventilation and IAQ research needs.

Ventilation technology is defined as the hardware necessary to bring outdoor air into a building and to treat and effectively distribute the outdoor air to and within the occupied spaces of the building.

Purpose

IAQ is a broad topic. The purpose of this systems analysis is to investigate the relationship between ventilation and IAQ.

Goals

Goals of this analysis were to

1. define the state-of-the-art in building design and operation,
2. identify emerging technologies and trends that will influence IAQ, building design, and operation, and
3. define and prioritize ventilation research needs that will improve IAQ.

General Description

The ventilation technology systems analysis was developed in two phases. Phase I was to determine the status of applied ventilation technology and its impact on IAQ, using surveys and interviews with five groups of professionals involved with IAQ and the heating, ventilating, and air-conditioning (HVAC) industry: researchers, equipment manufacturers, design engineers, construction contractors, and building managers.

Phase 2 was to bring together 60-80 IAQ and ventilation experts for a Ventilation and IAQ Consensus Workshop to achieve the stated goals. The workshop was held September 14-16, 1994, in Raleigh, NC.

Findings

IAQ has become an issue as a result of several influences: conservation practices, building construction techniques, new construction materials, and a more litigative environment. A lack of understanding and communication has resulted in minimal accountability for over-

all IAQ. IAQ is rarely designed for, rather it is the by-product of, several systems and contracted work coming together. Codes and standards that define acceptable IAQ are needed. The absence of standards discourages designers, manufacturers, operators, and owners from achieving IAQ conditions generally agreed to be reasonable economically and important to health.

Some owners, designers, builders, and operators are recognizing that the costs of achieving acceptable IAQ generally are more than offset by the benefits of improved productivity and health for building occupants.

Research consensus topics that were determined address the industry's knowledge deficiencies. Research should proceed concurrently in (1) IAQ control—including ventilation, air cleaning, and source management, (2) understanding IAQ impacts and health effects, and (3) risk assessment/economic optimization of systems.

Ventilation research priorities are (1) evaluate different system designs for their impact on IAQ, (2) develop checklists, protocols, standards, and codes that guide and regulate the design, construction, commissioning, operation, and maintenance of HVAC systems, (3) define ventilation effectiveness and the method of its field verification, (4) develop advanced IAQ sensors and control techniques, (5) develop adequate models to predict air and contaminant distribution, (6) validate ASHRAE Standard 62-1989 to see if it really results in acceptable IAQ, and (7) measure effectiveness of outdoor air supply strategies.

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The complete report, entitled "Ventilation Technology Systems Analysis," (Order No. PB95-212767; Cost: $27.00, subject to change) will be available only from:
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